

[FERROELECTRIC SINGLE CRYSTAL RESONATOR AND METHODS FOR PREPARATION AND USE THEREOF]

Abstract

A ferroelectric single crystal consisting essentially of potassium tantalate and the alkali metal substituting from about 1% to 3% of potassium or a group (V) metal substituting in part for tantalum, having cubic form of perovskite crystalline structure, and essentially free of impurities and defects is produced by growing it from a melt of a potassium precursor, a tantalum oxide and the alkali metal precursor or a group (V) metal oxide. A microwave resonator comprising the single crystal that is useful in a number of RF and EPR applications, an EPR spectrometer comprising a ferroelectric single crystal resonator, a rectangular cavity, a permanent magnet with planar poles, and a radio frequency AC generator with two connecting wires, and a NMR spectrometer comprising a magnet, means for transmitting a radio frequency magnetic pulse and detecting NMR signal, and a ferroelectric single crystal resonator are also disclosed.